

## CLAIMS

1. An organic capacitor having voltage-controlled capacitance, comprising at least the following functional layers:

- 5 - a first electrode (2), a second electrode (5), and  
- an insulator layer (4) disposed between the first and second electrodes (2, 5),

**characterized by**

10 at least one first semiconductor layer (3) provided between the first and second electrodes (2, 5);

wherein the concentration of free charge carriers in at least said first semiconductor layer (3) is varied in a controlled manner by application of a voltage ( $U_{52}$ ) between said first and second electrodes (2, 5) and the concentration of said charge carriers determines the capacitance of the capacitor.

- 15 2. An organic capacitor as defined in claim 1, **characterized in that** the concentration of said free charge carriers in at least said first semiconductor layer (3) is additionally varied in a controlled manner by a frequency of the applied voltage ( $U_{52}$ ).

- 20 3. An organic capacitor as defined in claim 1 or claim 2, **characterized in that** the variation of the concentration of said free charge carriers results in a variation of an effective spacing (a) of the electrodes (2, 5) serving as capacitor plates, wherein said effective spacing (a) functionally determines the capacitance.

- 25 4. An organic capacitor as defined in any one of the previous claims, **characterized in that** the variation of the concentration of said free charge carriers results in a variation of an effective plate surface area, and said effective plate surface area functionally determines the capacitance.

5. An organic capacitor as defined in any one of the previous claims, **characterized in that** at least one of said first and second electrodes (2, 5) is a structured electrode (2', 5').
- 5 6. An organic capacitor as defined in any one of the previous claims, **characterized in that** at least one of said first and second structured electrodes (2', 5') is embedded in said semiconducting layer (3).
- 10 7. An organic capacitor as defined in any one of the previous claims, **characterized in that** said organic capacitor comprises a second semiconductor layer (6) provided between said first and second electrodes (2, 5) and disposed on one of the sides of said insulator layer (4) opposite said first semiconductor layer (3), the concentration of said free charge carriers in said second semiconductor layer (6) being varied in a controlled manner by applying a voltage ( $U_{52}$ ) between said first and second electrodes (2, 5).
- 15 8. An organic capacitor as defined in claim 6, **characterized in that** said first and second semiconducting layers (3, 5) are of opposed conductivity types.
- 20 9. An organic capacitor as defined in claim 6 or claim 7, **characterized in that** at least one of said first and second structured electrodes (2', 5') is embedded in at least one of said first and second semiconductor layers (3, 6).
- 25 10. An organic capacitor as defined in any one of the previous claims, **characterized in that** at least one of said functional layers is a layer of an organic substance.